

I Claim:

1. A multi-positional switch for providing an operator with tactile sensing in
2 order for the operator to determine the various switching positions of the switch,
comprising:

4 a housing having an upper end and an opposite lower end;

6 an axially disposed contact terminal secured to the lower end of the housing
and projecting externally therefrom;

8 a plurality of radially disposed contact terminals secured to the lower end of
the housing and projecting externally therefrom;

10 a push button mounted to the upper end of the housing and capable of
selective depression and toggling in axial and radial directions when manipulated by
the operator;

12 a drive stem coupled to the push button and capable of selective slidable
linear and radial motion as a result of the depression and toggling of the push button;

14 a toggle plate disposed within the housing adjacent the lower end and having
a toggle plate aperture and an entry chamfer through which the drive stem can pass
16 whereupon depression of the push button in the axial direction causes the drive stem
to pass through the toggle plate aperture and toggling the push button in a radial
18 direction causes the drive stem to slide against the entry chamfer for providing
resistance to movement of the push button for conveying a tactile sensation to the
operator as the push button is toggled into engagement with one of the plurality of
20 radially disposed contact terminals; and

22 a resistance pin disposed within the housing adjacent the lower end and
between the toggle plate and the axially disposed contact terminal, the resistance pin
24 positioned perpendicular to the drive stem so that the forcible contact of the drive
stem against the resistance pin is conveyed to the operator through tactile sensing in

26 order for the operator to determine that the drive stem has been brought into engagement with the axially disposed contact terminal.

2 2. The multi-positional switch according to claim 1, further comprising:

4 a pliable cap disposed within the housing and secured to the push button whereby the cap moves in axial and radial directions concomitant with the depression and toggling of the push button, and

6 a guide shaft mounted to the pliable cap and movable in axial and radial directions concomitant with the movement of the cap, the guide shaft having a passageway that is coaxial with the housing when the push button is in the non-depressed state.

2 3. The multi-positional switch according to claim 2, further comprising a primary spring disposed within the housing encompassing the drive stem and seated on the guide shaft for facilitating the movement of the drive stem against and past the resistance pin and for returning the drive stem to the non-engaged state when the operator releases the push button.

4 4. The multi-positional switch according to claim 1, wherein:

2 the housing includes a hole positioned perpendicular to the drive stem for disposition of the resistance pin; and

4 the resistance pin positioned extending from the hole whereupon the axial movement of the drive stem from the depression of the push button forcibly contacts the resistance pin and causes the resistance pin to retract back into the hole so that the

drive stem can pass by the resistance pin and can engage the axially disposed contact
8 terminal.

5. The multi-positional switch according to claim 4, further comprising a
2 compression spring positioned within the hole and attached to the resistance pin for
providing tension on the spring and enabling the spring to extend from the hole and to
4 retract back into the hole.

6. The multi-positional switch according to claim 1, wherein the radially
2 disposed contact terminal further comprises an auxiliary contact having an angled
portion which is bendable for providing the engagement of the drive stem and the
4 contact terminal.

7. The multi-positional switch according to claim 1, wherein the toggle plate
2 includes a surface positioned substantially perpendicular to the contact terminal and
positioned adjacent to and extending from the entry chamfer, the drive stem sliding
4 over the surface of the toggle plate into contact with one of the plurality of radially
disposed contact terminals.

8. The multi-positional switch according to claim 1, wherein the drive stem
2 includes a recess, the resistance pin extendable into the recess of the drive stem as the
push button is depressed extending the drive stem into contact with the axially
4 disposed contact terminal.

9. The multi-positional switch according to claim 1, wherein:

2 the axially disposed contact terminal includes one centrally positioned contact
terminal; and

4 the plurality of radially disposed contact terminals include two radially
disposed contact terminals for providing 3-way switching including two horizontal
6 directions and a downward direction.

10. The multi-positional switch according to claim 1, wherein:

2 the axially disposed contact terminal includes one centrally positioned contact
terminal; and

4 the plurality of radially disposed contact terminals include four radially and
equally spaced contact terminals for providing a five position switch.

11. A multi-positional switch for aircraft for providing the operator with
2 tactile sensing for determining the various switching states of the switch, comprising:

4 a housing having an upper end and an opposite lower end;

6 a plurality of electrical contact terminals secured to the lower end of the
housing in both axial and radial dispositions and protruding externally therefrom;

8 a push button mounted to the upper end of the housing and capable of
selective toggling and depression in the axial and radial directions when depressed by
the operator;

10 a toggle plate mounted within the housing adjacent the lower end and having
an entry chamfer and a toggle plate aperture coaxial with the push button when the
switch is in the non-depressed state;

12 a longitudinally extending drive stem capable of slidable, linear movement
within the housing concomitant with the depression of the push button in the axial
14 direction and the toggling of the push button in radial directions;

16 the drive stem passing through the toggle plate aperture when the push button
is depressed in the axial direction for engaging one of the plurality of electrical
18 contact terminals and slidable on the entry chamfer of the toggle plate by the operator
toggling the push button so that the drive stem can contact another of the plurality of
electrical contact terminals; and

20 the push button toggled in the radial direction causing the drive stem to slide
against the entry chamfer of the toggle plate for providing resistance to movement of
22 the push button for conveying a tactile sensation to the operator as the push button is
toggled into engagement with one of the plurality of electrical contact terminals so
that the operator can determine the particular switching position of the switch
24 through touch sensing.

12. The multi-positional switch according to claim 11, further comprising a
2 resistance pin disposed within the housing adjacent the lower end, the resistance pin
positioned substantially perpendicular to the drive stem so that the forcible contact of
4 the drive stem against the resistance pin is conveyed to the operator through tactile
sensing in order for the operator to determine that the drive stem has been brought
6 into engagement with one of the plurality of electrical contact terminals.

13. The multi-positional switch according to claim 12, wherein:

2 the housing includes a hole positioned perpendicular to the drive stem for
disposition of the resistance pin; and

4 the resistance pin positioned extending from the hole whereupon the axial
movement of the drive stem from the depression of the push button forcibly contacts
6 the resistance pin and causes the resistance pin to retract back into the hole so that the
drive stem pass by the resistance pin and can engage the axially disposed contact
8 terminal.

14. A multi-positional switch, comprising:

2 a housing having an upper end and an opposite lower end;
4 at least one contact terminal secured to the lower end of the housing and
projecting externally therefrom;

6 a push button mounted to the upper end of the housing and capable of
selective movement when manipulated by the operator;

8 a drive stem disposed within the housing and coupled to the push button, the
drive stem capable of radial motion as a result of the toggling of the push button; and

10 a toggle plate disposed within the housing adjacent the lower end and having
a toggle plate aperture and an entry chamfer, contact of the drive stem against the
entry chamfer provides resistance to movement of the drive stem which conveys a
12 tactile sensation to an operator as the drive stem slides over the toggle plate for
electrically engaging the at least one contact terminal for providing the operator with
14 tactile sensing in order for the operator to determine various switching positions of
the switch.

2 15. The multi-positional switch according to claim 14, wherein the at least
one contact terminal includes at least two radially disposed contact terminals secured
to the lower end of the housing and projecting externally therefrom for providing at
4 least two way switching.

2 16. The multi-positional switch according to claim 14, wherein the at least
one contact terminal includes four radially disposed contact terminals secured to the
lower end of the housing and projecting externally therefrom for providing a four way
4 switch.

2 17. The multi-positional switch according to claim 14, further comprising:
the at least one contact terminal including an axially disposed contact
terminal secured to the lower end of the housing and projecting externally therefrom;
4 and

6 a resistance pin disposed within the housing adjacent the lower end and
perpendicular to the drive stem so that the forcible contact of the drive stem against
the resistance pin is conveyed to the operator through tactile sensing in order for the
8 operator to determine that the drive stem has been brought into engagement with the
axially disposed contact terminal.

2 18. The multi-positional switch according to claim 17, wherein:
the housing includes a hole positioned perpendicular to the drive stem for
disposition of the resistance pin; and

4 the resistance pin positioned extending from the hole whereupon the axial
5 movement of the drive stem from the depression of the push button forcibly contacts
6 the resistance pin and causes the resistance pin to retract back into the hole so that the
7 drive stem can pass by the resistance pin and can engage the axially disposed contact
8 terminal.

2 19. The multi-positional switch according to claim 14, wherein the at least
one contact terminal includes an axially disposed contact terminal and at least one
radially disposed contact terminal secured to the lower end of the housing and
projecting externally therefrom for providing the multi-positional switch..
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2 20. The multi-positional switch according to claim 19, further comprising a
primary spring disposed within the housing encompassing the drive stem and seated
on the guide shaft for facilitating the movement of the drive stem against and past the
resistance pin and for returning the drive stem to the non-engaged state when the
operator releases the push button.
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